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O&OPM-C10
Rev. K
1/25/2021

Owner's & Overhaul Procedures Manual

Dart C10 Remote Cargo Hook

**SUBJECT**

OWNERS & OVERHAUL PROCEDURES MANUAL 10,000 LBS REMOTE CARGO HOOK C10

REPORT

O&OPM-C10

REV. K

1/25/2021

DETAILS OF REVISIONS

Rev.	Date	Page	Description	Approved
N/C	05/05/09	All	Initial Release	P. Bravo
A	07/06/10	8	Revised Drawing in section 2.5	P. Bravo
B	07/18/11	All	Was Rev A on 07/06/10	Williamson
			IS Rev B on 07/18/11	
		3	Revised list of Effective Pages	
		9	Revised Section 3.0 Introduction	
		10	Revised Section 3.3	
C	11/07/12	All	Changed company logo.	Williamson
1	3/30/15	All	Combined Owners & Overhaul Manuals Updated Assembly Figures	J. Gilbert
2	9/9/15	18	Revised Section 5.0	J. Gilbert
		20	Revised Section 6.2	
		22	Revised Section 7.0	
		29	Revised Section 10.0	
		37	Revised Appendix I	
3	6/29/16	9	Revised Section 2.1	J. Gilbert
		11	Revised Section 3.0	
		17	Revised Warranty	
		21	Revised Section 6.1	
		31	Revised Section 10.0	
		38	Revised Figure 1	
		39	Revised Figure 2	

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DETAILS OF REVISIONS (Continued)

Rev.	Date	Page	Description	Approved
4	2/28/17	10	Revised Sections 2.1, 2.3	J. Gilbert
		22	Added Section 5.2	
		35	Revised Section 11.2.1	
		15	Added Section 3.6	
		38	Revised Table 11.6	
		43	Added Figure 6	
J	6/12/19	7	Revised Section 1.2	V. Morel
		10	Revised Sections 2.1 and 2.2	
		12	Revised Section 3.0	
		21	Revised Section 5.1	
		22	Revised Section 5.2	
		24	Revised Section 6.2	
		25	Revised Section 7.1	
		29	Revised Section 9.1	
		36	Revised Section 10.5.11	
		40	Revised Figure 1	
		43	Revised Figure 6	
K	1/25/21	6	Revised Section 1.1	S. Drouin

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Section 1.0: Introduction

UNIT WEIGHT:	34 lbs. (15.4 kg)
C10 REMOTE CARGO HOOK LIFT CAPACITY:	10,000 lbs. (4,536 kg)

1.1 PURPOSE:

The C10 Remote Cargo Hook has been designed to engage, lift, transport and release external loads from a long line cable suspended from a helicopter. The purpose of this document is to provide the customer with a detailed set of instructions necessary to complete regular maintenance and the overhaul procedure for the C10 Remote Cargo Hook. This may be used as an alternative to sending the C10 Remote Cargo Hook to an approved facility or returning it to Dart Aerospace for overhauls.

WARNING:

Use only as a long line hook. The C10 Remote Cargo Hook is not certified as a primary or belly hook attached to the helicopter.

WARNING:

As a precautionary measure, ensure Cargo Hook is in locked position by applying a load of 10-20 lbs by hand before full load is applied.

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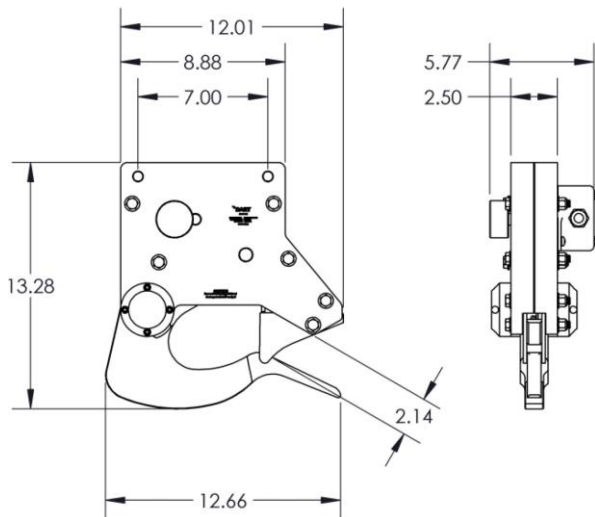
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1.2 PRODUCT FEATURE:

The C10 Remote Cargo Hook is encased by a pair of housing plates bolted together. The internal parts are made of high quality steel that has been heat treated and plated.



The toggle mechanism assures the positive lock of the hook, and an amplification of opening forces.

The adjustable clock springs allow the load beam to be returned automatically. The stainless steel springs are fully protected from the elements and hazardous snags by caps that are tapered and secured with screws. The Loadbeam return tension is set at the factory for the release weight of 13 lbs. but can be variable.

Our standard load beam with oversized throat will accommodate up to 5 eye chokers, 1-1/2 inches in diameter. Throat opening is 2.14" (54 mm).

Releasing loads can be performed manually (manual release knob), or electrically (solenoid).



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1.3 DESIGN FEATURES:

The C10 Remote Cargo Hook contains only five moving parts, far fewer than the competitors model.

Fewer parts mean less down time and reduced maintenance costs.

The housing plates are constructed of high quality aluminum.

Due to the simplified design and parts replacement, Dart Remote Cargo Hooks are easy to service and repair during field maintenance.

Dart Remote Cargo Hooks incorporate the highest quality materials and precision engineering for maximum strength and endurance. Each unit is proof tested prior to shipment.

1.4 PRECAUTIONS:

The following precaution definitions will be used to indicate the seriousness of the hazard or condition

WARNING: May be a maintenance procedure, practice, condition, etc., which could result in personal injury or loss of life.

CAUTION: May be a maintenance procedure, practice, condition, etc., which could result in damage or destruction of equipment.

NOTE: May be a maintenance procedure, practice, condition, or a statement that needs to be highlighted.



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1.5 DEFINITIONS:

The following terminology will be used to describe defects and imperfections:

CORROSION:	Chemical action on the surface either resulting in discoloration, a surface of oxide or in an advanced degree of removal of the original surface metal.
CRACK:	Fissure, which does not quite separate the metal.
DENT/NICK:	Depression of surface metal without removal of material.
DISTORTION:	Deviation from original shape.
SCRATCH:	Narrow, shallow marks or lines resulting from movement of a particle or object across a surface.



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Section 2.0: Technical Data

2.1 SPECIFICATIONS:

Lift capacity:	10,000 lbs. (4,536 kg)
Design Ultimate Strength:	50,000 lbs. (22,680 kg)
Minimum release load:	13 lbs. (5.9 kg)
Mounting:	Dual Point
Operational Voltage Range:	24/28 V – D.C.
Max Current:	15.7 A
Resistance Range:	1.7 – 2.0 Ω

WARNING:

Maximum Inner Ring diameter size of 5.00 inches is required
For Keeperless option see pp. 18 & 40.

2.2 DIMENSIONS:

Weight without Cage:	34 lbs. (15.4 kg)
Height:	13.28 inches (337 mm)
Thickness:	2.50 inches (64 mm) at lifting points 5.77 inches (147 mm) knob to solenoid cover 7.00 inches (178 mm) center of lifting points

2.3 RELEASE:

ELECTRICAL:

Electrical releases are accomplished by supplying 24 to 28 V DC to a rotary solenoid for a maximum of 5 seconds. The maximum current is:

$$28 \text{ V} / 1.78 \Omega = 15.7 \text{ A}$$

The solenoid is located by its two threaded studs and should sit flat on the side plate when properly installed. The solenoid is held in place by two nuts from the inside of the hook.

MECHANICAL (GROUND RELEASE):

It is possible to release loads to the rated capacity of 10,000 lbs. by turning the Manual Release Knob.

WARNING:

Prior to operating the manual release, make sure that you are not in the path of the load.

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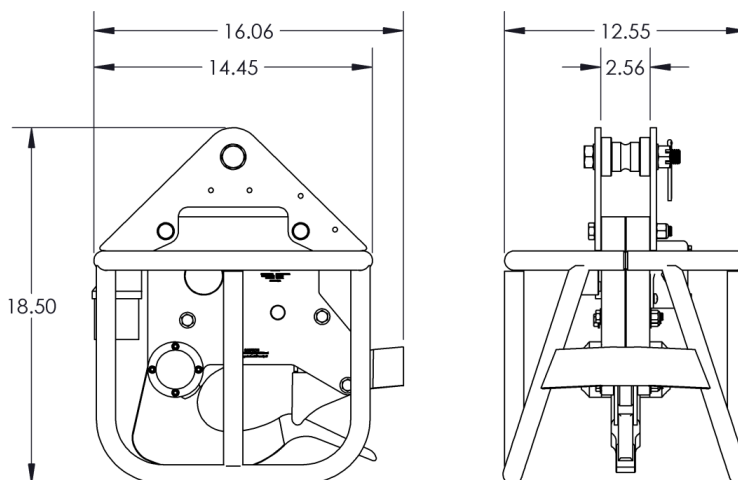
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2.4 CAGE SPECIFICATIONS:

Single Hook Cage (C10-C)



2.4.1 Cage Weight:

Single Hook Cage (C10-C):

26 LBS. (11.7 kg)

2.4.2 Cage Material:

1-inch Tubular Steel



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Section 3.0: Maintenance

Care should be exercised during handling of the C10 Remote Cargo Hook to prevent damage to moving or supportive parts. When the hook is in use, clean it daily and apply grease to the end of the load beam where it engages the lock.

The overhaul interval for Dart Remote Cargo Hooks is 5 years from the date of purchase or last overhaul or 1,500 hours of operational time, whichever comes first. See Overhaul Procedures starting at Section 6.0.

Any Dart Remote Cargo Hook showing indications of excessive wear, abuse or damage must be removed immediately for on-condition overhaul or repair prior to scheduled maintenance. The repair and/or overhaul can be performed by an approved facility, returned to Dart Aerospace, or by the Operator using a Dart Aerospace C10 Overhaul Kit (P/N: 648. 4703) in accordance with this manual.

Instructions for Returning Equipment to the Factory:

If a Dart Aerospace Remote Cargo Hook must be returned to the factory for any reason (including returns, service, repairs, overhaul, etc.), return the components freight, cartage, insurance and customs prepaid to:

DART AEROSPACE LTD.
1270 Aberdeen Street
Hawkesbury, ON, K6A 1K7
CANADA
Tel: 1 613 632 5200



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3.1 INSPECTION:

- Conduct a visual inspection of the outside the Remote Cargo Hook. Check for nicks, burrs, cracks or looseness of parts.
- Ensure that the mechanism works, rotating the Manual Release Knob, while applying hand pressure on the Load Beam.
- Electrically: use an Multimeter, check the continuity and resistance of the solenoid.

3.2 DISASSEMBLY:

Tools Required:

9/16 wrench

9/16 socket wrench

7/16 socket wrench

5/32 Allen wrench

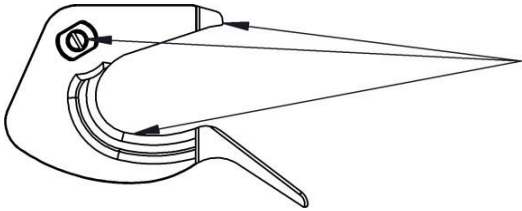
1/8 Allen wrench

Phillips screwdriver

- Remove the three (3) screws on the Solenoid Cover
- Remove Solenoid Cover
- Loosen housing nuts 6 places
- Remove Manual Release Knob
- Take off Manual Release Knob Side plate (opposite solenoid side)
- Entire inner mechanism is now totally exposed.
- Remove parts one piece at a time, clean off grease and grime using mild cleaning solvent or bath. Blow off excess cleaner and towel dry.

3.3 VISUAL INSPECTION:

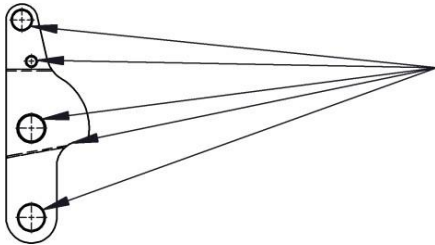
Visually inspect parts for wear on areas listed below:



3.3.1 Load Beam Assembly:

Nose, Trunnion and Choker areas.

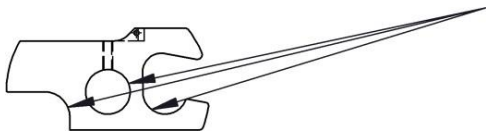
Load beam nose should be smooth and free of burrs or divots caused by lock. Angle should be set as per manufacturer's specifications. Trunnion should remain pressed in and not wobbly.



3.3.2 Lock:

Latch roller, Load beam and Lock shaft contact areas.

Lock at Load Beam face should remain smooth and at the proper angle. Contact point where latch roller contacts the load beam should not be distorted.



3.3.3 Latch:

Actuator slot, pivot hole and lock contact areas.

Latch should have smooth rotation.



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3.4 SOLENOID REMOVAL:

(Optional) If “Solenoid quick removal” feature is not equipped; the opening of the hook is necessary to remove the Solenoid Nuts (MS21083N4) from the solenoid’s studs.

3.4.1 Remove solenoid cover.

3.4.2 Pull out solenoid. The solenoid is located in place by round nuts mounted on the studs and held in place by the cover. Notice the rubber pad on the top of the cap. This gets pinched by the cover and held in place when the bolts are tight.

3.4.3 If any of the checked areas show signs of wear or overuse replace parts or send unit back for evaluation and overhaul.

3.5 ASSEMBLY:

3.5.1 Work in reverse order of disassembly.

3.5.2 Ensure all parts are clean and greased when installing components.

3.6 CYCLE TEST:

If the C10 Remote Cargo Hook must be disassembled for any reason, it is necessary to perform a load test prior to returning to service.

3.6.1 Engage a poly-urethane rope or steel cable in the throat of the load beam with an attached weight of 250-500 lbs. The load Stop should be free to lock back into the closed position between cycles. Lift and release the load a minimum of 3 times to ensure proper function.

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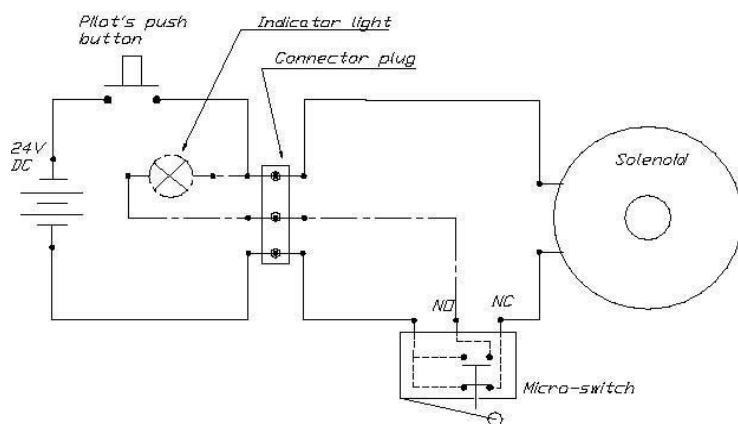
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Section 4.0: Miscellaneous Information**4.1 WIRING DIAGRAM (Optional):**

The pilot's push button switch for release is preferably mounted in one of the control levers for operation, so it can be operated without removal of the hands from the controls. To prevent unintentional operation, a guard may be mounted over the control button or a safety shut-off switch can be inserted in the circuit.

The circuit contains the solenoid safety micro-switch (Normally Closed – NC) that cuts the power off the solenoid in the open position of the release mechanism and an optional wiring can be provided for an OPEN position indicator light (using the Normally Open–NO contact of the micro-switch).

Standard wiring installation has been left to the operator's discretion.

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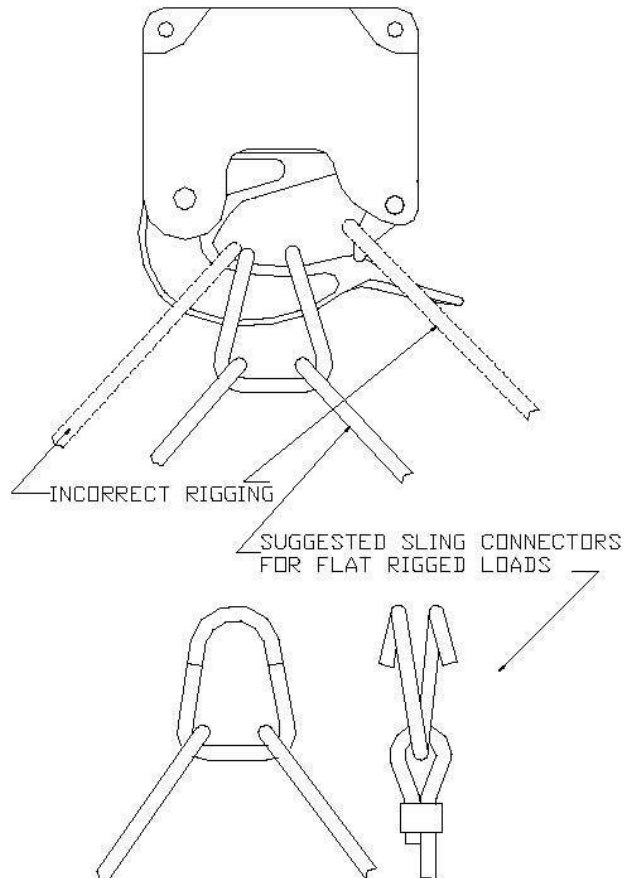
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4.2 RIGGING:

When cable angle is flatter than 45°, a connector is recommended.





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4.3 LIMITED WARRANTY:

Dart Aerospace warrants to the original customer and or owner, that the product will be free from defects in workmanship and materials, under normal use and services for which each product is intended for the warranty periods listed below from the date of delivery. Warranty shall be granted provided the product has been transported, stored, protected, unloaded, maintained and operated strictly in accordance with Dart Aerospace's instructions and/or manuals and that no unauthorized repairs have been attempted. The Dart Aerospace warranty stated herein is intended for new products and aftermarket services sold through Dart Aerospace or its Subsidiaries (Authorized Service Centers or Authorized Distributors). Internal components installed and manufactured from other manufacturers are not covered by Dart Aerospace and are subject to OEM warranties. Dart Aerospace reserves the right to evaluate the product and determine if the unit is subject to warranty.

New Product Sales:

The period of warranty for new product sales is One (1) calendar year from the date of delivery to the customer.

Services:

The period of warranty for Repair, Overhaul, or Exchange Services is Six (6) calendar months from the date of delivery to the customer.

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4.4 KEEPERLESS ADAPTER (OPTIONAL):

The Dart Model C10-K Remote Cargo Hook includes a keeperless adapter in which the Keeper remains fixed in place at all times, allowing the operator to use a variety of different ring sizes and/or rigging. Any Remote Cargo Hook with the Keeperless option retains the same manual/electrical release capabilities.

All information presented in this document is applicable to both the Model C10 and C10-K Remote Cargo Hooks. The only notable exception comes in Section 5.0: C10 Parts List; Part numbers C10-5A (Load Beam Assembly), C10-23 (Keeper Weldment), C10-23-1 (Keeper Spacer), C10-23-2 (Keeper Spring), and C10-23-3 (Keeper Bushing) are exclusive to the Model C10 Remote Cargo Hook, while part numbers C10-5KA (Keeperless Load Beam Assembly) and C10-23K (Stationary Keeper) are exclusive to the Model C10-K Remote Cargo Hook.

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Section 5.0: Parts Lists**5.1 C10 PARTS LIST:**

See Figure 1

PART#	NAME	QTY.
C10-1	Side Plate Solenoid Side	1
C10-2	Side Plate – MRK	1
C10-3	Load Beam Bumper	1
C10-4	Lock	1
C10-4-2	Lower Lock Roller	1
C10-4-3	Upper Lock Roller	1
C10-4-4	Upper Lock Roller Shaft	1
C10-4-5	Lower Lock Roller Shaft	1
C10-4-6	Lock Spring	1
C10-4-7	Spring Retaining Pin	1
C10-4-8	Lock Bushing	2
C10-4-9	Upper Roller DU Bearing	1
C10-4-10	Spring Anchor Spring Pin	2
C10-4-11	Lock Shaft	1
C3-12-6	Lock Roller Retaining Ring	2
C45-12-6	Retaining Ring	2
C10-5A	Load Beam Assembly	1
C10-7	Locating Pin	3
C10-8	Trunnion Bushing	2
C10-9-1	Latch	1
C10-9-2	Latch Bearing	1
C10-9-4	Latch Shaft Bushing	2
C10-9-5	Latch Shaft	1
C10-9-6	Latch Return Spring	2
C10-10-1	Actuator Shaft	1
C10-10-2	Actuator Pin	1
C10-10-3	Actuator Bushing	2
C10-11	Manual Release Knob	1
C10-12	Solenoid Assy (Figure 4)	1
C10-12-0	Solenoid	1 per C10-12
C10-12-1	Spring Pin	1 per C10-12



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C45-8-2-4	Spacer	1 per C10-12
32446	22-16 AWG Knife Connector	2 per C10-12
C45-8-4	Solenoid Cover Gasket	1
C45-8-5	Solenoid Cover	1
C10-21-1	Clock Spring	2
C10-21-2	Spring Cover	2
C10-21-4	Lock Washer	8
C10-22	Bumper	3
C10-23	Keeper Weldment	1
C10-23-1	Keeper Spacer	1
C10-23-2	Keeper Spring	1
C10-23-3	Keeper Bushing	2
C10-41	Strain Relief Connector	1
188-FPSS-1032-1/4	Set Screw	2
188-FPSS-1/4 20-3/8	Set Screw	2
188-SHCS-1032-3/4	Bolt	8
AN4-24A	Bolt	2
AN6-31A	Bolt	6
AN960-416	Washer	3
AN960-416L	Washer	2
AN960-616L	Washer	12
MS21083N4	Nylock Nut	2
MS21044N6	Lock Nut	6
MS27039-4-08	Screw	1
600.1309	Label (not shown)	1
600.1347	C10 Warning Label (not shown)	1
C2-14-2	Label Rivets (not shown)	2
EL-PLUG-M	Male Plug (not shown)	1
01121-734A5 OR 01004-08-047	Electrical Wire 3/14 (not shown)	1
32448	16-14 AWG Knife Connector (not shown)	2
	Heat Shrink Tube (not shown)	1

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5.2 C10 CAGE PARTS LIST (C10-C):

See Figure 6

PART#	NAME	QTY.
C10-27	Cage Weldment	1
C10-28A	Lifting Bushing	1
AN12H40	Lifting Bolt	1
AN310-12	Lifting Bolt Nut	1
NAS1149F1232P	Lifting Bolt Washer	2
C10-34	Bumper	1
C10-35	Cage Bumper Nut	1
NAS1149C0663R	Cage Bumper Washer	1
MS24665-363	Cotter Pin	1
AN8-37A	Cage Bolt	2
AN960-816L	Washer	4
MS21044N8	Lock Nut	2

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Section 6.0: Overhaul Preparation

Before the overhaul process may begin, the following preparations must be made.

6.1 REQUIRED ITEMS:

The following items are required to complete the overhauling process as outlined in this manual:

- **Dart Aerospace C10 Overhaul Kit (P/N: 648.4703)**
- **Loctite #620 Retaining Compound**
- **Aeroshell Grease 7**
- **SAF-T-EZE Copper Anti-Seize (or equivalent)**
- **Vinyl Electrical Tape**
- **Standard Multimeter**
- **Parts Washing Solvent**
- **Aluminum Oxide 100/200/400, or Scotch Brite (or similar)**
- **Raychem RNF-100 Heat-Shrink Tubing .25"exp - .125"rec (or equivalent)**

6.2 PARTS LIST AND ASSEMBLY FIGURES:

A copy of the complete parts list and assembly figures are included in this document and may be used as a reference source at any time.

Table 6.2 below lists all the parts contained in the Dart Aerospace C10 Overhaul Kit (P/N: 648.4703). It is recommended that this table be used to verify that all parts are present.

PART#	NAME	QTY. (648.4703)
C10-3	Load Beam Bumper	1
C10-4-6	Lock Spring	1
C10-4-7	Spring Retaining Pin	1
C10-4-8	Lock Bushing	2
C10-4-9	Upper Roller DU Bearing	1
C10-4-10	Spring Anchor Spring Pin	2
C3-12-6	Lock Roller Retaining Ring	2
C45-12-6	Retaining Ring	2

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C10-7	Locating Pin	3
C10-8	Trunnion Bushing	2
C10-9-2	Latch Bearing	1
C10-9-4	Latch Shaft Bushing	2
C10-9-6	Latch Return Spring	2
C10-10-2	Actuator Pin	1
C10-10-3	Actuator Bushing	2
C45-8-4	Solenoid Cover Gasket	1
C10-21-4	Lock Washer	8
C10-22	Bumper	3
C10-23-1	Keeper Spacer	1
C10-23-2	Keeper Spring	1
C10-23-3	Keeper Bushing	2
188-FPSS-1032-1/4	Set Screw	2
188-FPSS-1/4 20-3/8	Set Screw	2
188-SHCS-1032-3/4	Bolt	8
600-1309-A	Label (not shown)	1
C2-14-2	Label Rivets (not shown)	2
600.1347	C10 Warning Label (not shown)	1
AN4-24A	Bolt	2
AN6-31A	Bolt	6
AN960-416	Washer	3
AN960-416L	Washer	2
AN960-616L	Washer	12
MS21083N4	Nylock Nut	2
MS21044N6	Lock Nut	6
MS27039-4-08	Screw	1

Table 6.2 – Dart Aerospace C10 Overhaul Kit Parts List



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Section 7.0: Overhaul Disassembly

These procedures are for the complete disassembly of the C10 Remote Cargo Hook.

NOTE: The term “Remove” implies the temporary separation and/or un-installation of parts which are then reused later in the overhaul. The term “Discard” implies the permanent disposal of a part and is reserved only for components which have a replacement found in the Dart Aerospace C10 Overhaul Kit.

- 7.1 Remove and discard the two (2) Bolts (AN4-24A), the one (1) Screw (MS27039-4-08), and the three (3) Washers (AN960-416).
- 7.2 Remove the Solenoid Cover (C45-8-5) and the Solenoid Cover Gasket (C45-8-4). Discard the Solenoid Cover Gasket.
- 7.3 Remove and discard the two (2) Set Screws (188-FPSS-1/4 20-3/8) securing the Manual Release Knob.
- 7.4 Remove the Manual Release Knob (C10-11).
- 7.5 Remove and discard the two (2) Label Rivets (C2-14-2). Remove the Label (600.1309), if applicable.

NOTE: If the writing on the Label is clearly legible (i.e. the label is free from any major scratches, nicks, and/or dents) it may be reused and is not necessary to remove. If not, stamp all label information onto the blank Label (600.1309-A) included in the Dart Aerospace C10 Overhaul Kit and discard the old label.

- 7.6 Remove and discard the Six (6) Bolts (AN6-31A), Six (6) Lock Nuts (MS21044N6), and twelve (12) Washers (AN960-616L).

NOTE: Keep one (1) of the old Bolts (AN6-31A) to aid in reassembly.

- 7.7 With the Side Plate Solenoid Side (C10-1) face down, separate and remove the Side Plate-MRK (C10-2) exposing the entire inner mechanism. Be careful not to disturb the parts inside.
- 7.8 Remove and discard the Load Beam Bumper (C10-3) and the three (3) Bumpers (C10-22).



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7.9 Remove and completely disassemble the Lock Assembly. Discard the two (2) Retaining Rings (C45-12-6), the two (2) Lock Roller Retaining Rings (C3-12-6) and the Lock Spring (C10-4-6).

7.10 Remove and completely disassemble the Latch Assembly. Discard the Latch Return Spring (C10-9-6), the Latch Bearing (C10-9-2), and the Actuator Pin (C10-10-2).

NOTE: The Latch Bearing (C10-9-2) is pressed inside the Latch (C10-9-1). It is recommended that an arbor press be used with an appropriately sized punch to separate these components.

7.11 On the opposite side of the Side Plate Solenoid Side, remove and discard the four (4) Bolts (188-SHCS-1032-3/4).

NOTE: The spring is turned clockwise about one half turn. Be sure to hold the cover in place while removing screws to prevent rotation. Release spring pressure slowly.

7.12 Remove the Spring Cover (C10-21-2) and Clock Spring (C10-21-1).

7.13 Repeat Steps 7.11 & 7.12 on the Side Plate-MRK (C10-2).

7.14 Remove Load Beam Assembly (C10-5A).

7.15 Remove and discard the two (2) Nylock Nuts (MS21083N4) and two (2) Washers (AN960-416L) holding the Solenoid in place. Remove the Solenoid Assy (C10-12).

7.16 On the Solenoid wires, carefully remove and discard the layer of shrink tubing covering the terminal connections. Do not remove the terminal fittings. In the event that a terminal fitting needs replacing, use a 22-16 AWG Knife connector.

7.17 Remove the Spacer (C45-8-2-4).



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- 7.18 Remove and discard the three (3) Location Pins (C10-7), and two (2) Spring Anchor Pins (C10-4-10) from the Solenoid Side Plate.

CAUTION: Pin press fittings may be very tight. Avoid excessive bending during removal, as this may result in permanent deformation or damage to the Pins and/or Side Plate. If any of the pins are too difficult to remove, leave them in place and proceed to the next step.

- 7.19 Remove the Latch Shaft Bushing (C10-9-4), the Actuator Bushing (C10-10-3), the Trunnion Bushing (C10-8), and the Lock Bushing (C10-4-8) from the Side Plate Solenoid Side (C10-1) using an arbor press and the appropriately sized punches.

Remove the Latch Shaft Bushing (C10-9-4), the Actuator Bushing (C10-10-3), the Trunnion Bushing (C10-8), and the Lock Bushing (C10-4-8) from the Side Plate- MRK (C10-2) using an arbor press and the appropriately sized bushing punches.

Discard all bushings and bearings.

- 7.20 Remove and discard the C10 Warning Label (600.1347) from the Side Plate – MRK (C10-2), if applicable.



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Section 8.0: Overhaul Cleaning

The following cleaning instructions should be performed as described after completing Section 7.0. All dust, dirt, corrosion, rust and moisture must be removed, to prevent operational failure of the hook.

8.1 GENERAL CLEANING PROCEDURES:

- 8.1.1 Clean all metal parts with parts washing solvent or equivalent. Remove caked on dirt with a stiff-bristle or non-metallic brush.

CAUTION: Because the solenoid is an electric component, do not use excessive amounts of solvent, or similar. Clean by hand.

- 8.1.2 Dry all parts thoroughly with a lint free cleaning cloth and blow off extra cleaning materials from hard to reach areas.

- 8.1.3 Ensure that all parts are free of rust, corrosion and abrasive matter. Remove minor surface corrosion, scratches and imperfections by polishing lightly with abrasive cloth.

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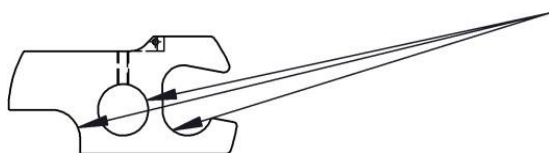
Section 9.0: Overhaul Check and Inspection**9.1 PARTS REPLACEMENT:****NOTE:** This section is mandatory.

Ensure that the following parts have been properly discarded (as per Section 7) and replaced with the parts (if applicable) found in the Dart Aerospace C10 Overhaul Kit:

- All hardware (nuts, bolts, washers, screws, pins, retaining rings)
- All nylon spacers
- All bearings
- All gaskets
- All bumpers
- Solenoid nuts
- All springs (except Clock Spring)
- All updated parts
- Rivets and Labels
- Trunnion Lock Bushings

9.2 VISUAL INSPECTION:**NOTE:** This section is mandatory.

Visually inspect all parts for wear and tear. Any component showing excessive wear, abuse, cracks, corrosion, or damage must be removed and replaced before overhauling can resume. The following parts should be given special attention as outlined below.

9.2.1 Latch

Roller, pivot hole and bearings.

Check for Latch Roller rotation and divots on roller surface. Latch side plate bearings should have smooth rotation.

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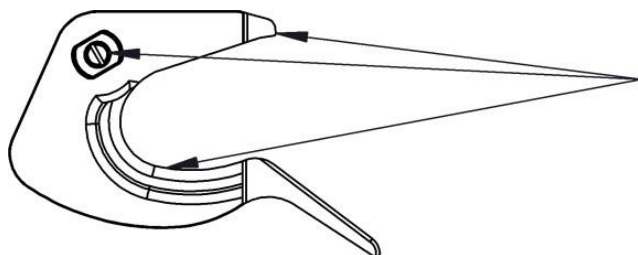
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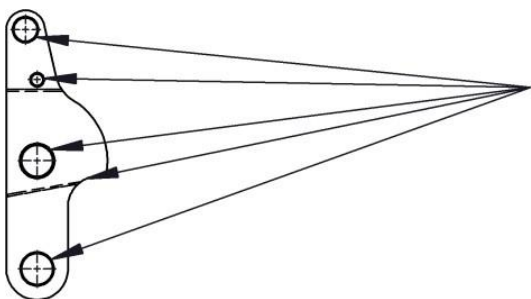
9.2.2 Load Beam



Nose, Trunnion, and Choker areas.

Load beam nose should be smooth and free of burrs or divots caused by lock. Trunnion should remain pressed in and not loose.

9.2.3 Lock



Latch roller, Load Beam, and Lock Shaft contact areas.

Load Beam face should remain smooth and free of burrs or divots. Contact point where latch roller contacts the load beam should not be distorted.

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9.3 NON-DESTRUCTIVE TESTING:

NOTE: This section is mandatory.

The following parts must be sent out for NDT (Non Destructive Testing) and replaced upon failure:

- Both Side Plates
- Load Beam Assy
- Actuator Shaft
- Latch
- Latch Shaft
- Lock
- Upper Lock Roller Shaft
- Lower Lock Roller Shaft
- Upper Lock Roller
- Lower Lock Roller
- Lock Shaft
- Keeper Spacer

9.4 PLATING:

The following parts are subject to re-plating only when necessary due to wear and plating loss:

- Lock
- Lower Lock Roller
- Upper Lock Roller
- Upper Lock Roller Shaft
- Lower Lock Roller Shaft
- Lock Shaft
- Load Beam Assy*
- Latch
- Latch Shaft
- Actuator Shaft
- Keeper Weldment

NOTE: Some newer parts will not require plating; the Latch, Actuator Shaft, and Link may be made out of stainless steel.

NOTE: Apply electroless nickel plate to a thickness of .0004in to .0006in. Bake as required for hydrogen embrittlement relief.

* Thickness of .0009in to .0011in.



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Section 10.0: Overhaul Re-Assembly

NOTE: Ensure that the previous section has been properly completed before beginning the re-assembly process outlined below.

10.1 SIDE PLATE PREPARATION:

- 10.1.1 Apply Loctite to faying surfaces of the Latch Shaft Bushing (C10-9-4) and the Side Plate Solenoid Side (C10-1) and press in place. Ensure that the ends of the Latch Shaft Bushing are flush to the cavity surface of the side plate.
- 10.1.2 Apply Loctite to faying surfaces of the Actuator Bushing (C10-10-3), the Trunnion Bushing (C10-8), the Lock Bushing (C10-4-8), the Keeper Bushing (C10-23-3), and the Side Plate Solenoid Side (C10-1) and press in place. Ensure that all bushings are flush, or below, the surface of the side plate. Remove any excess Loctite from side plate.
- 10.1.3 Repeat steps 10.1.1 and 10.1.2 for the Side Plate-MRK (C10-2).
- 10.1.4 Apply grease to faying surfaces of the three (3) Locating Pins (C10-7), the two (2) Spring Anchor Spring Pins (C10-4-10), and the Side Plate Solenoid Side (C10-1). Press in place and remove any excess grease.
- 10.1.5 Apply grease to faying surfaces of the Load Beam Bumper (C10-3), the three (3) Bumpers (C10-22), and the Side Plate Solenoid Side (C10-1). Press in place and remove any excess grease.

10.2 SOLENOID ASSEMBLY INSTALLATION:

- 10.2.1 Re-install the Spacer (C45-8-2-4).
- 10.2.2 Temporarily install the solenoid assembly onto the back (outer facing surface) of the Side Plate Solenoid and check that neither end of the Spring Pin (C10-12-1) come in contact with the Actuator Bushing (C10-10-3). Remove and adjust as necessary.

NOTE: When installed, the wires extending from the Solenoid Assembly should be pointing down (i.e. towards the Load Beam [not yet installed]).

- 10.2.3 Apply grease to inner surface of Actuator Bushing (C10-10-3).



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10.2.4 Install the Solenoid Assembly (C10-12) using two (2) Solenoid Nuts (MS21083N4) and two (2) Washers (AN960-416L). Torque to 30 in. lbs.

10.2.5 Using a small brush or Q-Tip, apply grease to the Solenoid shaft.

10.3 LATCH & ACTUATOR SHAFT ASSEMBLY INSTALLATION:

10.3.1 Press the Latch Shaft (C10-9-5) into the Latch Bearing (C10-9-2). Polish pin if necessary.

10.3.2 Apply Loctite to faying surfaces of the Latch Bearing (C10-9-2) and Latch (C10-9-1) and install using the two (2) Latch Set Screws (188-FPSS-1032-1/4). Remove any excess Loctite.

10.3.3 Apply grease to the inner surface of Latch Shaft Bushing (C10-9-4) and Actuator Bushing (C10-10-3).

10.3.4 Install the Actuator Pin (C10-10-2) into the Actuator Shaft (C10-10-1).

10.3.5 Apply grease to faying surfaces and Install the Actuator Shaft (C10-10-1) into the Actuator Bushing (C10-10-3).

10.3.6 Install one end of each of the two (2) Latch Return Springs (C10-9-6) onto the Latch (C10-9-1) and hold in place.

10.3.7 Install the Latch Assembly onto the Side Plate Solenoid Side (C10-1).

NOTE: Be sure that both the Latch Return Springs remained in the correct position during installation.

10.3.8 Install the Free end on each of the two (2) Latch Return Springs on the Spring Anchor Spring Pin (C10-4-10).

10.3.9 Ensure free and proper movement when the Latch is rotated from side-to-side.

10.3.10 Grease all Latch Assembly parts.



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10.4 LOCK ASSEMBLY INSTALLATION:

- 10.4.1 Press the Upper Lock Roller DU Bearing (C10-4-9) into the Upper Lock Roller (C10-4-3). Apply Retaining Compound to secure the bearing into the roller. The bearing should be flush on both sides of the roller.
- 10.4.2 Grease and install the Upper Lock Roller (C10-4-3) and Upper Lock Roller Pin (C10-4-4) into the Lock (C10-4). Secure the Pin with the two (2) Lock Roller Retaining Rings (C3-12-6).
- 10.4.3 Grease and install the Lower Lock Roller (C10-4-2) and Lower Lock Roller Shaft (C10-4-5) into the Lock (C10-4). Secure the Shaft with the two (2) Retaining Rings (C45-12-6).
- 10.4.4 Install the Spring Retaining Pin (C10-4-7) and the Lock Spring (C10-4-6) into the Lock (C10-4). Ensure that the pin is sub-flush on both sides of the Lock.
- 10.4.5 Apply grease to inner surface of the Lock Bushing (C10-4-8) on the Side Plate Solenoid Side (C10-1) and install Lock Shaft (C10-4-11) (separate from Lock Assembly).
- 10.4.6 Align the Lock Assembly with the Lock Shaft (C10-4-11) and install onto the Side Plate Solenoid Side (C10-1). Apply grease to faying surfaces.
- 10.4.7 Loop the free end of the Lock Spring (C10-4-6) around the Spring Anchor Spring Pin (C10-4-10) and slide it down into place.
- 10.4.8 Apply grease over the entire surface of both Lock Rollers.

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10.5 PARTS INSTALLATION:

- 10.5.1 Apply grease to inner surface of the Trunnion Bushing (C10-8) and install Load Beam Assembly (C10-5A).

NOTE: At this point, test to make sure the Load Beam will latch into place correctly as well as release properly. Once it is determined that all inner mechanisms are functioning properly return the Load Beam to its locked position.

- 10.5.2 Install the Keeper Spring (C10-23-2) onto the Keeper Spacer (C10-23-1). Align Both Parts with the Keeper Weldment (C10-23) and hold in place.
- 10.5.3 Temporarily install the old Bolt (AN6-31A) from step 7.6 into the Side Plate Solenoid Side (C10-1) to aid in installation of the Keeper.
- 10.5.4 Install Keeper Assembly onto the old Bolt (AN6-31A). Ensure that the Keeper Spring (C10-23-2) is properly aligned.
- 10.5.5 Apply grease to the Latch Shaft Bushing (C10-9-4), the Actuator Bushing (C10-10-3), the Trunnion Bushing (C10-8), the Lock Bushing (C10-4-8), and the Keeper Bushing (C10-23-3), already installed on the Side Plate – MRK (C10-2).
- 10.5.6 Install Side Plate – MRK (C10-2) and remove any excess grease from the exterior surfaces.

NOTE: Ensure that the Keeper Spring remains in the proper position during placement of the Side Plate – MRK.

- 10.5.7 Install the two (2) Clock Springs (C10-21-1) and the two (2) Clock Spring Covers (C10-21-2) onto both plates making sure that the Clock Spring tangs are properly seated in the slots of the Load Beam Assembly (C10-5A). Apply grease to all Clock Spring faying surfaces.
- 10.5.8 Turn the hook assembly over and install the Manual Release Knob (C10-11) using the two (2) Set Screws (188-FPSS-1032-1/4). The Set Screws must bottom out on the notch. Use Anti-Seize on the Set Screws.
- 10.5.9 Apply Anti-Seize to the six (6) Bolts (AN6-31A) and install. Place on and tighten all washers and nuts to 25 ft. lbs. of torque.



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- 10.5.10 On the Solenoid, ensure that all wires are connected as required and apply shrink tubing over exposed terminal connections. Wiring should be reconnected with the solenoid cover; Strain Relief Connector (C10-41) should already be mounted to the solenoid cover.
- 10.5.11 Install the Solenoid Cover (C45-8-5) and the Solenoid Cover Gasket (C45-8-4) with the two (2) Bolts (AN4-24A), the one (1) Screw (MS27039-4-08), and the three (3) Washers (AN960-416).
- 10.5.12 On the Side Plate – MRK (C10-2), rotate the Clock Spring Cover (C10-21-2) in a clockwise motion (about one half turn) until the set screw holes are aligned. Install the four (4) Screws (188-SHCS-1032-3/4). See section 11.1.3 for final adjustments.
- 10.5.13 Repeat step 10.5.12 on the Side Plate Solenoid Side (C10-1) Clock Spring Cover (C10-21-2) with counter-clockwise rotation.

NOTE: C10-K Model Clock Springs set to have no tension.

- 10.5.13 Use two (2) Label Rivets (C2-14-2) to attach the Label (600.1309-A) on the Side Plate – MRK (C10-2), if applicable. The serial numbers should be stamped on the label prior to installation.
- 10.5.14 Place the C10 Warning Label (600.1347) on the front face of the Side Plate – MRK (C10-2), if applicable.

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Section 11.0: Overhaul Assembly Inspection, Testing, and Checkout

This section provides information and procedures required for operational checkout, testing and troubleshooting.

The following special items are required:

- DC Power Supply
 - Specification: NFB Filtered DC Power Supply; Range: 0-32 Volts
- Test Cell with load measuring gauge
 - Specification: Capability to provide a force of at least 25,000 lbs.

NOTE: All test procedures in this section are mandatory. If testing cannot be completed as specified on site, the Remote Cargo Hook may be sent out to an approved facility for testing.

11.1 PRELIMINARY INSPECTION:

- 11.1.1 Check that the Keeper is able to rotate in the necessary direction and firmly springs back to the closed position when released.
- 11.1.2 Apply hand pressure to the Load Beam and make sure it remains locked. While pressure is still being applied, rotate the Manual Release Knob. The Load Beam should unlock with ease.

NOTE: For the C10-K Model Remote Cargo Hook, the Clock Spring is set to have no tension, but remains fully adjustable depending on user requirements.

- 11.1.3 From an unlocked position, check that the Load Beam is able to automatically return to a fully locked and closed position. If it does not, remove the Clock Spring Cover and adjust the tension of the Clock Spring as necessary.

11.2 ELECTRICAL AND MECHANISM CHECKOUT:

- 11.2.1 Using a power supply, check the solenoid operation. Apply 24 – 28 volts to the solenoid for a maximum of 5 seconds. The solenoid should rotate freely.



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11.3 AIRWORTHINESS STANDARD:

- 11.3.1 Gradually apply force until the load reaches 25,000 LBS. (11,340 kg) on the Load Beam.

WARNING:

DO NOT RELEASE THE LOAD AT THIS WEIGHT. SERIOUS DAMAGE COULD BE CAUSED TO PERSONNEL AND/OR EQUIPMENT.

- 11.3.2 Hold this load for two (2) minutes. Gradually reduce the load to zero.

11.4 CYCLE TEST:

- 11.4.1 Engage a poly-urethane rope or steel cable in the throat of the load beam. The load beam should be free to lock back into the closed position between cycles. Conduct the tests shown in Table 11.6 at the end of this section. All tests must successfully pass.

11.5 VIBRATION TEST:

- 11.5.1 After the C10 Remote Cargo Hook has been cycle tested, apply a load of 10,000 LBS. (4,535 kg). Use a 1-inch shackle connected to the Load Beam to conduct this portion of the test.
- 11.5.2 Using a hammer, strike the shackle with a medium force ten (10) times. The C10 Remote Cargo Hook should not release the load.



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11.6 SOLENOID TEST SHEET:

# of Releases	Load (LBS.)	Release Method	Remarks	Result	Pass/Fail
1	25,000	Static Hold	Hold for two minutes and reduce load to zero	N/A	
10	5,000	Electrical, 25 volts	No 'hang ups' permitted	N/A	
2	10,000	Electrical, 22 volts	Current shall not exceed 12.4A	Amp.	
2	7,500	Electrical, 22 volts	Current shall not exceed 12.4A	Amp.	
2	5,000	Electrical, 22 volts	Current shall not exceed 12.4A	Amp.	
2	2,500	Electrical, 22 volts	Current shall not exceed 12.4A	Amp.	
2	500	Electrical, 22 volts	Current shall not exceed 12.4A	Amp.	
1	10,000	Electrical, 20 volts	Current shall not exceed 11.3A	Amp.	
1	10,000	Electrical, 28 volts	Current shall not exceed 15.8A	Amp.	
1	10,000	Manual		N/A	
1	10,000	Impact Test	Impact Shackle 10 Times, shall not release	N/A	
1	N/A	Solenoid Ohm's	Shall not exceed 1.7 – 2.0 Ω	Ohms	
1	N/A	Electrical Continuity	Across both wires	N/A	

Table 11.6 - Test Sheet for Solenoid

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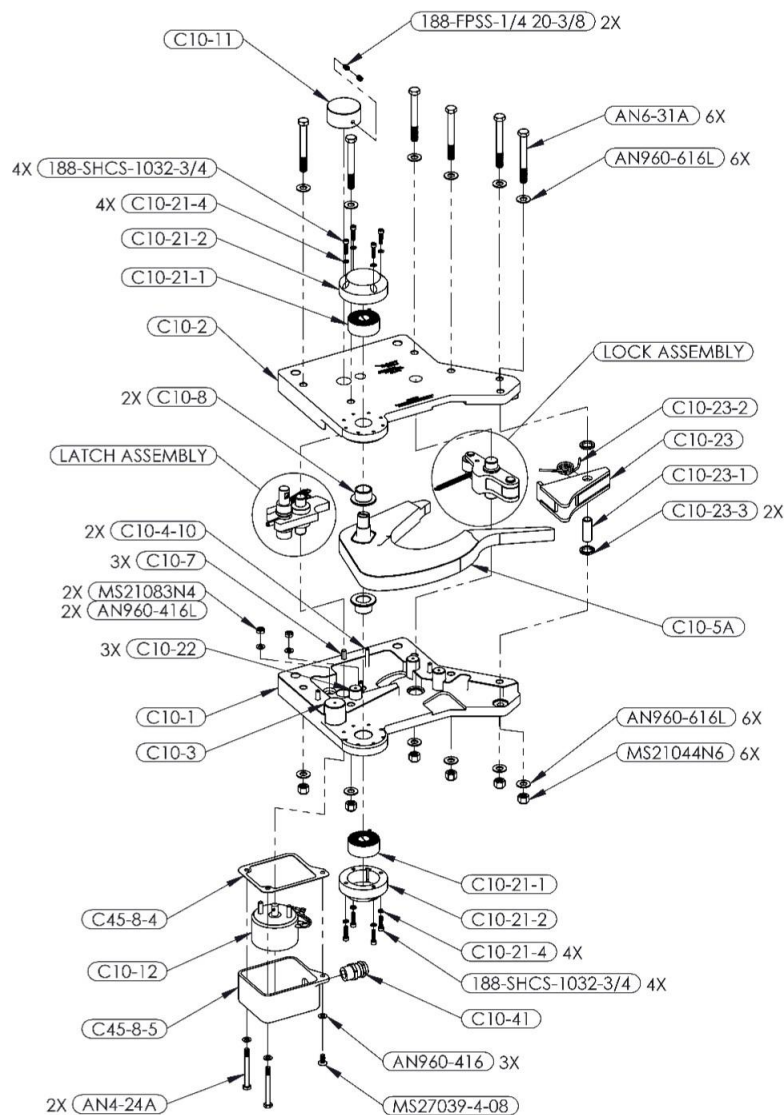
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Appendix I: Assembly Figures

Figure 1 - Exploded View:



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Figure 2 - Latch & Actuator Shaft Assembly:

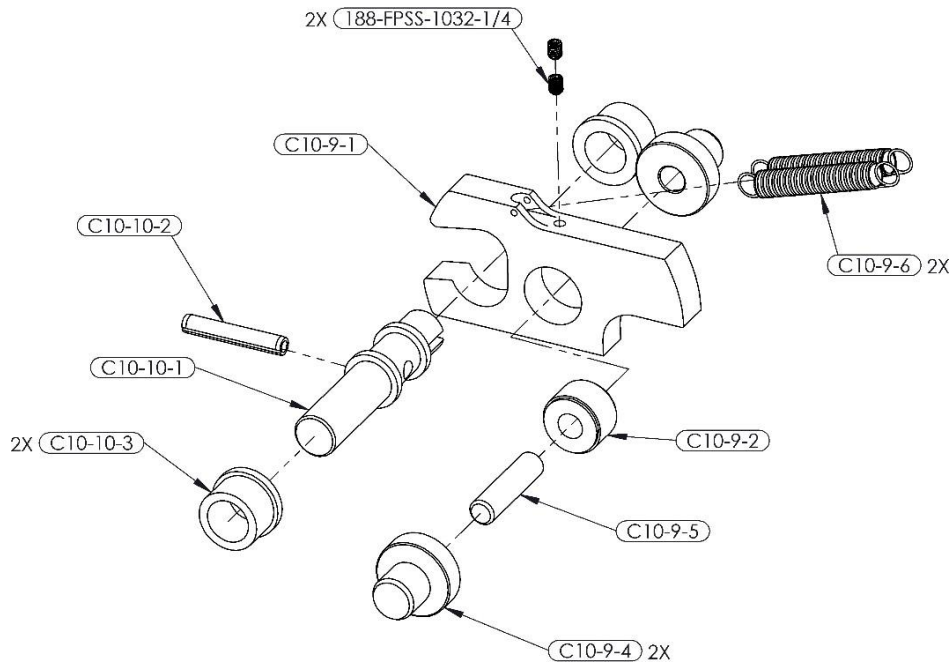
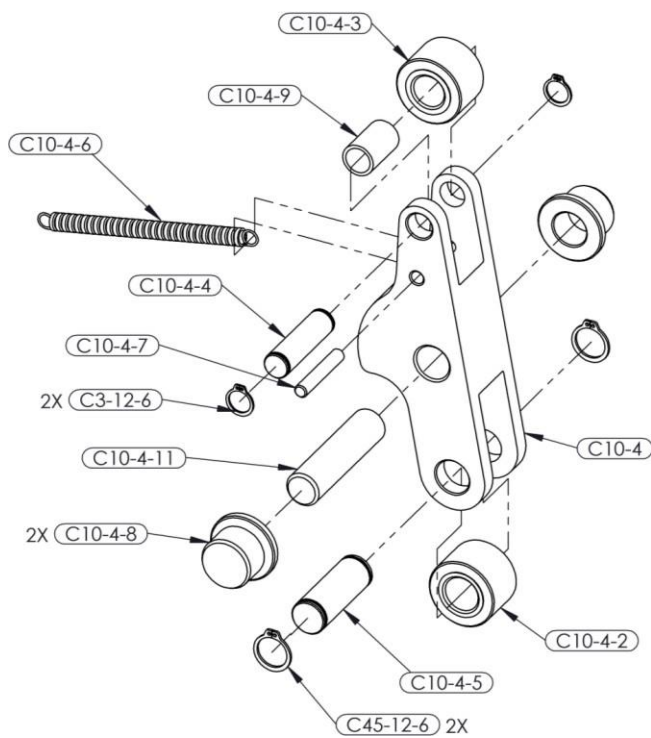


Figure 3 - Lock Assembly:



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Figure 4 - Solenoid Assembly:

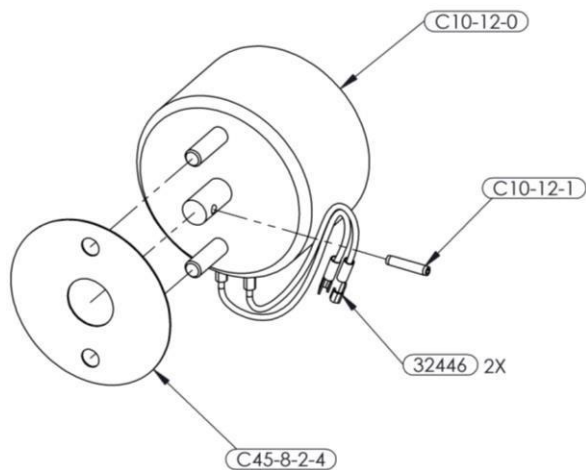
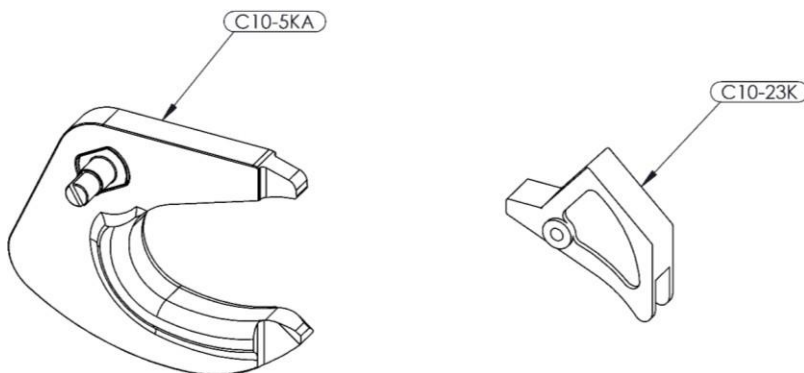


Figure 5 - Keeperless Adapter:



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Figure 6 - C10 Cage (C10-C):

